Proposal Reviews

#206: Investigation of Historical and Future Critical Climate Conditions on Water Use Patterns and Restoration Efforts in the Cosumnes Watershed: A Case Study

University of California, Davis

Initial Selection Panel Review	
Research and Restoration Technical Panel Review	
Delta Regional Review	
External Scientific Review	#1 #2 #3 #4
Prior Performance/Next Phase Funding	
Environmental Compliance	
Budget	

Initial Selection Panel Review:

CALFED Bay-Delta 2002 ERP PSP
Initial Selection Panel Review

Proposal Number: 206

Applicant Organization: University of California, Davis

Proposal Title: Investigation of Historical and Future Critical Climate Conditions on Water Use Patterns and Restoration Efforts in the Cosumnes Watershed: A Case Study

Please provide an overall evaluation rating.

Explanation of Recommendation Categories: Fund

- **As Is** (a proposal recommended for funding as proposed)
- **In Part** (a proposal for which partial funding is recommended for selected project phases or components)
- **With Conditions** (a proposal for which funds are recommended if the applicant contractually agrees to meet the specified conditions)

Consider as Directed Action in Annual Workplan (a proposal addressing a high priority action that requires some revision followed by additional review prior to being recommended for funding)
Not Recommended (a proposal not currently recommended for funding-after revision may be considered in the future)

Note on "Amount":

For proposals recommended as Fund As Is, Fund In Part or Fund With Conditions, the dollar amount is the amount recommended by the Selection Panel.

For proposals recommended as Consider as Directed Action in Annual Workplan, the dollar amount is the amount requested by the applicant(s).

Fund	
As Is	**-**
In Part	**-**
With Conditions	**-**
Consider as Directed Action	**-**
Not Recommended	**X**

Amount: **$0**

Conditions, if any, of approval (if there are no conditions, please put "None"):

None

Provide a brief explanation of your rating:

Although the Cosumnes River is an area in which restoration and research have been focused, and a study of this type would be desirable for the Cosumnes watershed, the technical review panel raised a number of concerns regarding this proposal and the regional panel gave the proposal a low rating. Technical panel concerns included the complexity and usefulness of the modeling system, risks associated with use of relatively untested and documented approach, lack of a clear plan to validate climate model output, and inadequate accounting for uncertainties in projections of future climate. The Selection Panel does not recommend funding this proposal.

Research and Restoration Technical Panel Review:

CALFED Bay-Delta 2002 ERP PSP
Research and Restoration Technical Panel Review Form

Proposal Number: 206

Applicant Organization: University of California, Davis

Proposal Title: Investigation of Historical and Future Critical Climate Conditions on Water Use Patterns and Restoration Efforts in the Cosumnes Watershed: A Case Study

Review:

Please provide an overall evaluation summary rating:

Superior: outstanding in all respects;
Above Average: Quality proposal, medium or high regional value, and no significant administrative concerns;
Adequate: No serious deficiencies, no significant regional impediments, and no significant administrative concerns;
Not Recommended: Serious deficiencies, significant regional impediments or significant administrative concerns.

Overall Evaluation Summary Rating	**Provide a brief explanation of your summary rating**

-Superior	PIs respond to these concerns and re-submit their proposal next year. This project will provide a fairly complete modeling system for use in understanding the effects of groundwater pumping, land use change, urbanization etc. on the water balance of the Consumnes basin. This modeling approach can be applied to other basins, providing a tool that can provide knowledge on the effects of CALFED actions.

The panel was concerned that the complexity of the proposed modeling system may limit its real-world applications. The linked atmospheric-hydrologic modeling system will require considerable computing power, meaning that very few water management agencies will be able to run the model themselves. There would be value in this work if the ultimate product was a model with which water management agencies could play what-if games, but this is simply not possible with the methodology that is proposed (the major product of this study for decision-makers is knowledge, not an integrated modeling system that will be widely used). This concern would perhaps not be so problematic if the PIs complex high-resolution modeling system was necessary for accurately simulating hydrologic impacts of climate variability, but there is no reason to expect that the PIs system will even add value over simpler, coarse resolution approaches that are based on station data.

The panel was also concerned that the approach is inadequately tested and documented. The use of regional climate models to provide high resolution simulations of climate is in its infancy. Most high-resolution regional climate modeling studies have focused on specific storms, and the simulations have only been run for periods of a few days. It is unclear if the decade-long simulations will provide bias-free estimates of near-surface meteorology (regional climate simulations are often hampered by significant biases that limit their use in hydrologic applications). There was no clear plan for validation of the high-resolution regional climate model output.

In terms of hydrologic modeling, the panel was concerned that the hydrologic model is poorly documentedthe only literature cited was a couple of reports to the Japanese Government. There are some aspects of the hydrologic modeling methodology (e.g., a priori estimation of model parameters) that warrant a clear demonstration of model performance.

For the climate change aspect of this proposal, the panel was concerned that the approach does not properly account for uncertainties in projections of future climate. Results from one GCM do not provide an adequate estimate of the large range in climate extremes that we anticipate to occur in the future. This concern would diminish if the PIs used historical data and the GCM scenario in conjunction to characterize our expectations of future climate, but it appears that the PIs plan to use the historical data and downscaled GCM output as separate estimates of current and future climate. The PIs must use results from several GCMs to properly provide an estimate of the range of future climate conditions.

For the above reasons, and the low rating of the proposal by the regional panel, we rate this proposal ADEQUATE. The panel does recognize the need to model the hydrologic effects of factors such as urbanization and groundwater pumping. If this proposal is not funded in this round, we recommend that the

-Above average	
XAdequate	
-Not recommended	

1. **Goals and Justification.** Does the proposal present a clear statement of goals, objectives and hypotheses? Does the proposal present a clear justification and conceptual model for the project?

   The goals of this proposal are fairly clear, and this project is justified on the basis of improved ability to model climate and hydrologic processes. This project may ultimately have value to decision-makers in that it will provide information on the effects of urbanization, groundwater pumping, etc. on the Consumes basin water balance. However, the panel thought that the proposed approach is inadequately tested and documented, and

does not account for the uncertainties in future climate projections. The panel does recognize the importance of the Cosumnes River in CalFed restoration efforts.

2. **Likelihood of Success (Approach, Feasibility, Capabilities and Performance Measures).** Is the project likely to succeed based on the approach, feasibility and project team capabilities? Are the proposed performance measures adequate for measuring the project's success?

   The combination of historical and anticipated future climate conditions provides a good range of climate variability for decision-makers. The concerns about the validity of the approach are three-fold. First, it is not clear that the complex modeling approach proposed in this study will add value to existing modeling approaches, and it is not clear that such a complex modeling approach is necessary to assess the impact of CALFED restoration efforts. Second, the approach does not properly account for uncertainty in future climate projections. Third, there is no clear plan for assessing the validity of the output from different models.

   If success is measured in terms of improving the skill in each of the individual models proposed for use, then the project could succeed (although there needs to be a much clearer plan for model validation). If success is measured in terms of providing an appropriate framework for assessing the impact of CALFED restoration efforts, then the probability for success is lower.

3. **Outcomes and Products.** Will the project advance the state of scientific knowledge in general and/or make an important contribution to the state of knowledge of the Bay-Delta Watershed? For restoration proposals, is the project likely to contribute to ecosystem restoration or species recoveries in a significant way? Will the project produce products useful to decision-makers and scientists?

   The project will advance the skill of individual models, and should ultimately be of value to decision-makers.

4. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

   The budget is reasonable and adequate for the work described in the proposal.

5. **Regional Review.** How did the regional panel(s) rank the proposal (High, Medium, Low)? Did the regional panel(s) identify significant benefits (regional priorities, linkages with other activities, local involvement) or impediments (local constraints, conflicts with other activities, lack of local involvement) to this proposal? What were they?

   The proposal received a "Low" rating from the Delta Regional review. The main concern was "climate change models/scenrarios have already been run for the Sacramento and American Rivers; preparing one for the Cosumnes does not appear to be a high priority at this time."

6. **Administrative Review.** Were there significant concerns about the proposal with regard to the prior performance, environmental compliance and budget administrative reviews? What were they?

   Budget - $544,881 in 17A, $578,102 in the budget summary. Tasks on pages 10 and 11 are not reflected in budget summary tables.

   Environmental Compliance - "The applicant states they will use a Categorical Exemption under CEQA, but the work proposed does not constitute a project defined under CEQA."

Miscellaneous comments:

None.

Delta Regional Review:

Proposal Number: 206

Proposal Title: Investigation of Historical and Future Critical Climate Conditions on Water Use Patterns and Restoration Efforts in the Cosumnes Watershed: A Case Study

Overall Ranking: **X**Low **-**Medium **-**High

Provide a brief summary explanation of the committee's ranking:

Climate change models/scenarios have already been run for the Sacramento and American rivers; preparing one for the Cosumnes does not seem to be a high priority at this time.

1. Is the project feasible based on local constraints?

   XYes **-**No

   How?

   Project has a high probability of success. Applicant team has hydrometerological modeling experience in this and other Central Valley watersheds. A linked surface-groundwater model has already been developed for this watershed with CVPIA funding, so this project is not considered a high priority at this time.

2. Does the project pursue the restoration priorities applicable to the region as outlined in the PSP?

   XYes **-**No

   How?

   Project supports multi-regional priority #4 (Ensure restoration and water management action through all regions can be sustained under future climatic conditions.)

3. Is the project adequately linked with other restoration activities in the region, such as ongoing implementation projects and regional planning efforts?

   XYes **-**No

   How?

   X

4. Does the project adequately involve local people and institutions?

   XYes **-**No

   How?

X

Other Comments:

X

External Scientific: #1

Research and Restoration External Scientific Review Form

Proposal Number: **206**

Applicant Organization: **University of California, Davis**

Proposal Title: **Investigation of Historical and Future Critical Climate Conditions on Water Use Patterns and Restoration Efforts in the Cosumnes Watershed: A Case Study**

Conflict of Interest Statements:
I have no financial interest in this proposal.
XCorrect
-Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

None.

Review:

Please provide an overall evaluation summary rating:

Excellent: outstanding in all respects;
Good: quality but some deficiencies;
Poor: serious deficiencies.

Overall Evaluation Summary Rating	**Provide a brief explanation of your summary rating**
-Excellent	**The PI's propose to link a series of complex models to assess the impact of CALFED restoration efforts on Cosumnes River streamflow. Of the models the PIs plan to use, those I am familiar with have known problems, for those I am not familiar with the PIs do not provide information on model accuracy. The climate change aspect of this research fails to adequately account for uncertainty in climate change projections. I do not see any way that funding for this project can be justified.**
-Good	
XPoor	

1. **Goals.** Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the concept timely and important?

   The goals of this project are rather unclear. The proposal is unfortunately a somewhat rambling description of various atmospheric and hydrologic models, and it is difficult to determine what the PIs actually plan to do. Is the concept important? If the concept is to understand the effects of groundwater pumping, land use change, urbanization, etc. on the water balance, then perhaps it is important, but I think there will be too many uncertainties in their modeling approach for them to provide useful information.

2. **Justification.** Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

   The PIs propose to link a series of complex models to (I think) assess the impact of CALFED restoration efforts on the region's water resources. Their proposal is mostly a model building exercise, and will not have any immediate use for decision-makers. I have several problems with their research approach (described in the next section) and do not think that full-scale implementation of the project is justified.

3. **Approach.** Is the approach well designed and appropriate for meeting the objectives of the project? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology or approaches? Will the information ultimately be useful to decision-makers?

   The PIs plan to use a nested regional climate model (MM5) to provide atmospheric data at 1 hour time increments and at 2-km resolution for two historical climate periods (the 1986-1991 drought and the December 1996-January 1997 flood) and two decade long time-slices in the future (2025-2034 and 2090-2099), and use these data to drive a hydrologic model to simulate streamflow in the Consumnes River.

   The validity of this approach is unclear for several reasons:

   1. It is not clear that 2-km spatial resolution is necessary to compute runoff over the Cosumnes basin. Many studies (several of which are cited in this proposal) have successfully simulated runoff at a much coarser spatial resolution.

   2. It is not clear that the high-resolution regional climate model output will be superior to station observations. In my experience, regional climate model output often contains significant mean biases (e.g., long-term mean temperatures may be 5oC too high) which adversely affects the hydrologic simulations when the regional climate model output is used as input to hydrologic models.

   3. There is considerable uncertainty in future projections of climate. The decade-long slices that the PIs plan to use from one GCM are considerably different from time slices from other GCMs. This uncertainty is associated with the chaotic nature of the climate system and will never be resolved. To adequately assess the effects of CALFED restoration on runoff in a future climate, the PIs need to propose a method that accounts for the uncertainty in future climate projections. Their current method is worse than doing nothing at all.

   4. The PIs provide no evidence that their model does a good job of simulating runoff. They cite two reports, but these were both reports to CRL, Japan, and I could not access them.

   5. Following from the above four points, I am very concerned that there is not a clear plan for assessing the validity of output from the different models. It is entirely possible that this extensive model building exercise will provide poor simulations of Consumnes River streamflow, and thus an inability of the model system to determine the impact of CALFED restoration efforts on the region's water resources.

   A better approach would be to start with a simple rainfall-runoff model, assess it's limitations for determining the impact of CALFED restoration efforts on the region's water resources, and attempt to fix those limitations one-by-one.

4. **Feasibility.** Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives?

   The approach is well documented (in a rambling sort of way), but I do not believe the approach is technically feasible (see Section 3). The likelihood for success is very low.

5. **Project-Specific Performance Measures.** Does the project include appropriate performance measures to measure success relative to the project's goals and objectives? Is there enough detail as to how the performance measures will be quantified? For restoration projects, are monitoring plans explicit and detailed enough to determine if performance measures will be adequately assessed?

   There are no performance measures outlined in this proposal, or any concerted effort to assess the accuracy of their model results (or, for that matter, if their complex modeling system that is riddled with uncertainties performs any better than a simpler coarser model).

6. **Products.** Are products of value likely from the project? Specifically for restoration projects, are products of value also likely from the monitoring component? Are interpretative outcomes likely from the project?

   I do not think this project will be successful, so do not think the products will be useful.

7. **Capabilities.** What is the track record of applicants in terms of past projects? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

   The PI's do have an impressive publication record, but do not provide any information on the accuracy of the models they propose to use.

8. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

   The benefit of this project is small, and the cost quite large. It's difficult to justify funding this project.

Miscellaneous comments:

None.

External Scientific: #2

Research and Restoration External Scientific Review Form

Proposal Number: **206**

Applicant Organization: **University of California, Davis**

Proposal Title: **Investigation of Historical and Future Critical Climate Conditions on Water Use Patterns and Restoration Efforts in the Cosumnes Watershed: A Case Study**

Conflict of Interest Statements:
I have no financial interest in this proposal.
XCorrect
-Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

None

Review:

Please provide an overall evaluation summary rating:

Excellent: outstanding in all respects;
Good: quality but some deficiencies;
Poor: serious deficiencies.

Overall Evaluation Summary Rating	**Provide a brief explanation of your summary rating**
-Excellent	**There is a great deal of uncertainty in the different phases of the modeling effort. It is not clear how planning agencies would use this information given the uncertainty, although the authors plan to coordinate with Calfed and DWR to discuss future management studies. The INFORM proposal has letters of support from other agencies, which may mean it would be more likely to be implemented than this approach.**
XGood	
-Poor	

1. **Goals.** Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the concept timely and important?

   There are two major goals: to incorporate existing modeling efforts on the Cosumnes Basin into a combined watershed hydrology-regional atmospheric/hydrologic modeling system to assess climate change scenarios, and 2) to evaluate the feasibility of extending this approach to a regional scale. The goals are clearly stated and are reasonable.

2. **Justification.** Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project

justified?

For the long-term success of restoration projects, the level of water use must be sustainable under various climatic conditions. The assessment of climate change fall under ERP's priority MR-4.

3. **Approach.** Is the approach well designed and appropriate for meeting the objectives of the project? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology or approaches? Will the information ultimately be useful to decision-makers?

   The general outline seems reasonable. The authors build upon existing models and data sets. The use of a non-hydrostratic model is important in a basin with steep terrain, as in the Cosumnes Basin. Downscaling from global models would be necessary, and the authors describe a nested hierarchical approach with four domains at finer spatial scales, going down to a 2-km resolution. The authors plan to incorporate of the impact of urbanization and different types of runoff in the basin. desirable. Different groundwater pumping patterns and surface water diversions would be compared under different climatic scenarios, and would be compared to historical water balances.

4. **Feasibility.** Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives?

   Time frame: the proposers do not accept the standard terms and conditions as set out by Calfed. This means the timeframe may need to be adjusted as contract specifications are resolved.

   The feasibility of the project is questionable. I would have more confidence in the approach if it had been tested against historical data in a basin with conditions similar to the Consumnes. The approach was used in a study in Japan, but the success and applicability of that past project was difficult to evaluate.

5. **Project-Specific Performance Measures.** Does the project include appropriate performance measures to measure success relative to the project's goals and objectives? Is there enough detail as to how the performance measures will be quantified? For restoration projects, are monitoring plans explicit and detailed enough to determine if performance measures will be adequately assessed?

   There were no specific performance measures listed. It is difficult to evaluate success' for model calibration. How well does the model need to perform to be successful, and what will the alternative approach be if the match with historical data is not close?

6. **Products.** Are products of value likely from the project? Specifically for restoration projects, are products of value also likely from the monitoring component? Are interpretative outcomes likely from the project?

   1) to implement an existing watershed hydrology model with and existing regional atmospheric/hydrologic model to evaluate the impact of critical climate conditions in the Cosumnes 2) A report assessing the feasibility of extending this approach to a regional scale. 3) Hold a series of workshops to disseminate information.

The products would be useful, but it would be important to transfer a technologically esoteric subject to the planners so they could implement land use and restoration activities by also considering climatic change. It was not clear how the planning agencies would use the results of the model.

7. **Capabilities.** What is the track record of applicants in terms of past projects? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

   The authors have strong backgrounds in modeling and watershed hydrology as well as experience in the Consumnes River.

8. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

   $578K for a three year modeling project is not unreasonable, but with no clear performance standards, it is a risk.

Miscellaneous comments:

External Scientific: #3

Research and Restoration External Scientific Review Form

Proposal Number: **206**

Applicant Organization: **University of California, Davis**

Proposal Title: **Investigation of Historical and Future Critical Climate Conditions on Water Use Patterns and Restoration Efforts in the Cosumnes Watershed: A Case Study**

Conflict of Interest Statements:
I have no financial interest in this proposal.
XCorrect
-Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

None

Review:

Please provide an overall evaluation summary rating:

Excellent: outstanding in all respects;
Good: quality but some deficiencies;
Poor: serious deficiencies.

Overall Evaluation Summary Rating	Provide a brief explanation of your summary rating
XExcellent	**All aspects of the review criteria are met at a high level.**
-Good	
-Poor	

1. **Goals.** Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the concept timely and important?

   Kavvas and Mount have presented a clear set of goals and objectives that deal with the issue of how climate changes may influence hydrological conditions in the Cosumnes watershed. They propose a modeling study using state-of-the-art models that is timely and quite important to CALFED.

2. **Justification.** Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

The proposal is founded on intimate understanding of the modeling of hydrological processes and climate models. Their selection of the Cosumnes watershed is a reasonable choice, and should readily lead to applications to other watersheds feeding the Delta.

3. **Approach.** Is the approach well designed and appropriate for meeting the objectives of the project? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology or approaches? Will the information ultimately be useful to decision-makers?

   Analyses of historical and future conditions using appropriate models is definitely the approach of choice. The combination of fine scale climate output with a physically based hydrological model should be useful to decision-makers.

4. **Feasibility.** Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives?

   The experience of the investigators and the maturity of the models to be used make the approach technically feasible and the likelihood of success high.

5. **Project-Specific Performance Measures.** Does the project include appropriate performance measures to measure success relative to the project's goals and objectives? Is there enough detail as to how the performance measures will be quantified? For restoration projects, are monitoring plans explicit and detailed enough to determine if performance measures will be adequately assessed?

   Project performance measure are not well articulated, except for discussion of model validation.

6. **Products.** Are products of value likely from the project? Specifically for restoration projects, are products of value also likely from the monitoring component? Are interpretative outcomes likely from the project?

   Modeled forecasts are likely and useful products.

7. **Capabilities.** What is the track record of applicants in terms of past projects? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

   Both investigators are leaders in their fields and more than up to the tasks at hand.

8. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

   Modeling requires well trained personnel and their reflects this need.

Miscellaneous comments:

External Scientific: #4

Research and Restoration External Scientific Review Form

Proposal Number: **206**

Applicant Organization: **University of California, Davis**

Proposal Title: **Investigation of Historical and Future Critical Climate Conditions on Water Use Patterns and Restoration Efforts in the Cosumnes Watershed: A Case Study**

Conflict of Interest Statements:
I have no financial interest in this proposal.
XCorrect
-Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

None

Review:

Please provide an overall evaluation summary rating:

Excellent: outstanding in all respects;
Good: quality but some deficiencies;
Poor: serious deficiencies.

Overall Evaluation Summary Rating	**Provide a brief explanation of your summary rating**
XExcellent	**I have much confidence in the two primary researchers on this proposal for Cosumnes River watershed modeling. They have chosen a watershed where major habitat restoration work is underway and where the findings can be directly used.**
-Good	
-Poor	

1. **Goals.** Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the concept timely and important?

   The goals seem well stated--basically to develop a fairly detailed hydrologic model of the Cosumnes River basin, starting with atmospheric models, so that future climate change scenarios can also be examined. A sufficiently long base period, 1958 - 2000, is incorporated to give a wide range of hydrologic conditions.

2. **Justification.** Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

This will be an interesting study in that they will not only model (calibrate) to today's conditions, but attempt to look in detail at the effect of predicted future climate change. Such changes, to the extent they occur, could make a lot of difference in the habitat restoration efforts underway on the lower Cosumnes River and elsewhere in the Central Valley.

3. **Approach.** Is the approach well designed and appropriate for meeting the objectives of the project? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology or approaches? Will the information ultimately be useful to decision-makers?

   The approach seems good, using existing models of the atmosphere and the watershed and adapting them for the specifics of the relatively small Cosumnes River watershed. This avoids the complications of major snowmelt driven watersheds. Although the Cosumnes River basin has some snow, it is primarily a rain runoff stream. To me, it makes sense to start with a somewhat simpler basin for an initial modeling effort.

4. **Feasibility.** Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives?

   The explanations of the two basic modeling tools, the MM5 atmospheric model and the UCDHRLM watershed model, are quite detailed and thorough. Since these are both working models, there should be no basic problem in fitting to the Cosumnes River watershed; detailed historical data may set limits. I do wonder a bit if the 2 km scale is necessary, considering the credence to be placed in the input derived from the future climate projections.

5. **Project-Specific Performance Measures.** Does the project include appropriate performance measures to measure success relative to the project's goals and objectives? Is there enough detail as to how the performance measures will be quantified? For restoration projects, are monitoring plans explicit and detailed enough to determine if performance measures will be adequately assessed?

   There are steps in the process for evaluation. The first major measure is how well the historical base period, 1958-2000, is simulated. Once that has been demonstrated, the researchers can move forward to the projected climate regimes. Downscaling from the big GCM climate models is an important link. The plan seems to be involvement of a number of groups in periodic progress reports; that should be a significant source of feedback.

6. **Products.** Are products of value likely from the project? Specifically for restoration projects, are products of value also likely from the monitoring component? Are interpretative outcomes likely from the project?

   Yes, the results should provide important new insights on the potential changes in watershed and runoff with future climate change. User will need to be aware that only a few possible future climate scenarios are being tested in this project. The Canadian GCM tends to yield a wetter California in contrast to some other atmospheric model scenarios. But the basic modeling tools being developed under this proposal will be available to run other scenarios later.

7. **Capabilities.** What is the track record of applicants in terms of past projects? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

The two professors, Prof Kavvas and Mount, have excellent reputations and are also quite knowledgable about the Cosumnes watershed. They won't be starting from scratch. I would expect a pretty good product.

8. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

   The proposed costs appear adequate for the extensive amount of calibration and operational studies. The major benefit would be insights on whether the large amounts of money now being spent on ecological restoration will prove to be wisely spent in future years or whether some of the restoration efforts will be untenable in a significantly different climate and hydrologic regime.

Miscellaneous comments:

When the project is complete, it would be worthwhile to compare with results by Dr. Norman Miller et al, of Lawrence Berkeley National Lab, in a November,2001, paper "Climate Change Sensitivity Study of California Hydrology, a Report to the CA Energy Commission" and to the work of Dr. Michael Dettinger and others at Scripps, also in 2001, entitled "Simulated Hydrologic Responses to Climate Variations and Change in the Merced, Carson, and American River Basins, Sierra Nevada, California, 1900-2099". Neither study directly modeled the Cosumnes River, but some relationship would be expected.

Prior Performance/Next Phase Funding:

New Proposal Number: 206

New Proposal Title: Investigation of Historical and Future Critical Climate Conditions on Water Use Patterns and Restoration Efforts in the Cosumnes Watershed: A Case Study

1. Prior CALFED project numbers, titles, and programs: (*list only projects for which you are the contract manager*)

   ERP 99-N06 ? Linked Hydrogeomorphic Ecosystem Models to Support Adaptive Management

2. Prior CVPIA project numbers, titles, and programs: (*list only projects for which you are the contract manager*)

   N/A

3. Have negotiations about contracts or contact amendments with this applicant proceeded smoothly, without persistent difficulties related to standard contract terms and conditions?

   -Yes **X**No -N/A

   If no, please explain any difficulties:

   The Office of Vice Chancellor for Research at UC Davis has requested numerous and repeated requests for revisions of the standard contract terms. Only a few of these issues were raised in the PSP process. Reconciling these issues has required extensive staff time for CALFED and other State agencies. This repeated negotiation has resulted in a delay of contract execution for up to 2 years.

4. Are the status, progress, and accomplishments of the applicant's current CALFED or CVPIA project(s) accurately stated?

   XYes -No -N/A

   If no, please explain any inaccuracies:

5. Is the applicant's progress towards these project(s)' milestones and outcomes to date satisfactory?

   XYes -No -N/A

   If no, please explain deficiencies:

6. Is the applicant's reporting, records keeping, and financial management of these projects satisfactory?

   XYes -No -N/A

If no, please explain deficiencies:

UC Davis has had consistent difficulty communicating internally and externally regarding its fiscal documentation. Reconciling financial issues with UC Davis has proved very problematic. The financial situations raised by UC Davis have proved to be the most difficult within the NFWF managed CALFED contracts.

7. Will the project(s) be ready for next phase funding in 2002, based on its current progress and expenditure rates?

XYes **-**No **-**N/A

If no, please explain:

Other Comments:

The difficulties expressed above are limited to UC Davis campus only.

The Principal Investigators and other project researches have been very professional and effective in meeting the goals of the project.

Environmental Compliance:

Proposal Number: 206

Applicant Organization: University of California, Davis

Proposal Title: Investigation of Historical and Future Critical Climate Conditions on Water Use Patterns and Restoration Efforts in the Cosumnes Watershed: A Case Study

1. Are the legal or regulatory issues that affect the proposal identified adequately in the proposal?

   XYes **-**No

   If no, please explain:

   The applicant states they will use a Categorical Exemption under CEQA, but the work proposed does not constitute a project defined under CEQA.

2. Does the project's timeline and budget reflect adequate planning to address legal and regulatory issues that affect the proposal?

   XYes **-**No

   If no, please explain:

3. Do the legal and regulatory issues that affect the proposal significantly impair the project's feasibility?

   -Yes **X**No

   If yes, please explain:

Other Comments:

Budget:

Proposal Number: 206

Applicant Organization: University of California, Davis

Proposal Title: Investigation of Historical and Future Critical Climate Conditions on Water Use Patterns and Restoration Efforts in the Cosumnes Watershed: A Case Study

1. Does the proposal include a detailed budget for each year of requested support?

   XYes **-**No

   If no, please explain:

2. Does the proposal include a detailed budget for each task identified?

   XYes **-**No

   If no, please explain:

3. Does the proposal clearly state the type of expenses encompassed in indirect rates or overhead costs?

   XYes **-**No

   If no, please explain:

4. Are appropriate project management costs clearly identified?

   -Yes **X**No

   If no, please explain:

   Explaination is incomplete!

5. Do the total funds requested (Form I, Question 17A) equal the combined total annual costs in the budget summary?

   -Yes **X**No

   If no, please explain (for example, are costs to be reimbursed by cost share funds included in the budget summary).

   Question 17a. = $544,881, and the Budget Summary = $578,102.

6. Does the budget justification adequately explain major expenses?

   XYes **-**No

If no, please explain:

7. Are there other budget issues that warrant consideration?

XYes **-**No

If yes, please explain:

Tasks on pages 10 & 11 are not reflected in the Budget Summary Tables.

Other Comments: